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No 76

An
Inaugural Dissertation,
On Miasmata,
Written by
Hudson A. Thornton, of Georgia,
And Submitted to the examination
of the Professors
of the
University of Pennsylvania.

Passed March 27th 1823

Hudson A. Thornton
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On Miasmata.

To contend that it is unnecessary for a Physician to know the cause of disease, would be as inconsistant as to say that it was not essential for a Surgeon to be well acquainted with the Anatomy of the subject for Operation; or for a Pharmaceutist with the article he would use in preparing his medicine. The importance of such knowledge is evidently manifested when a Physician is called to a Patient, who has taken Poison. Instead of trusting to uncertain and varying symptoms in one who requires instant attention, and which must be the case if the Physician is not acquainted with the circumstances. The indication is made plain to evacuate the stomache, without delay, of its deleterious contents, or administer some article that will neutralize or render ineffectual, the poison which has been taken.

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man of sensibility, who having engaged as Physician on board a transport ship or Merchantman, with a large crew, finds on landing at some distant unhealthy Port, an epidemic infecting the crew, and to witness a great mortality, daily surrounding him; Some of his dearest companions expiring, directly as it were in a fit of madness, and he unfortunately unable to judge of the cause, of the disease or even warn them of their impending danger

And how important is such knowledge to the members of a board of health, upon whose judgement depends the existence of, perhaps many thousand souls, in the prevailing epidemic of large cities

These indications must render the necessity of a perfect acquaintance with the causes of disease that require prompt and judicious treatment strikingly evident; And I cannot but indulge the expectation, that in selecting as the subject of my dissertation an enquiry into the cause of those diseases, that

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often devastate our wealthiest cities and most fertile districts. I shall in the interest and importance of the subject escape the imputation of presumption in attempting one of so much difficulty

For the principal part of these enquiries, it is proper to state, that I shall be indebted to the valuable works of Drs Bancroft and Johnson and from what I can remember of the invaluable lectures of my worthy Preceptor Dr Chapman.

The Creator of the world in his wise providence has caused the existence of certain important processes. Among them are those of evaporation, and what is concomitant to all organized nature putrefaction. The greater part of the beings that clothe and animate the surface of the earth is composed of perishable particles, animal and vegetable These processes under particular circumstances are put in action and produce vapours or exhalations, technically called Miasmata, or deleterious effluvia that possess a specific power,

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to excite diseases in the human body. These diseases are most commonly Intermittent, Remittent, and Continued Fevers, with Dysenteries and Catarrhs.

As the most of these diseases generally prevail in particular and circumscribed districts or countries, there is no doubt they proceed from a local cause, and Marsh Miasmata the effect of this cause, is the existing principle in producing the different diseases, that prove most mortal to the human race. According to the nature of the season and the impression made on the system, depends the particular nature or character of the disease.

We should look with gratitude and delight, on the improvements of Medical Science, and eagerly persist in the cause, while we make such rapid advances. Let us reflect that millions have fallen victims under the dark ages of Science, who might have been probably saved under present improved views of Practice, and

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It has not been much more than a century since some of the medical writers of the Eastern Continent, first particularly made known the deleterious effects of bad air, arising from low and marshy lands.

Sanchi a Physician of sound judgement who about the year Sixteen hundred wrote a treatise on the cause of disease, gives us the first intelligible account of the effects of Marsh Miasmata. He is said to have been the first who made that important observation, and demonstrated it by actual experiments, by draining and thereby causing the drying up of a pond, whose exhalations had been productive of great disease in the vicinity of Rome.

It is with a melancholy reflection that we read of the ignorance of former Periods. The deleterious exhalations that arise from marshy lands, were so unknown even to the ruling men of

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the nations, that they chose, but and most unhealthy situations on which to build their cities. The Portuguese chose St. Jago to establish the capital of their possessions in Guinea, in preference to many much more healthy islands, quite as convenient; and so destitute were they of that knowledge, which would have been conducive to their health, that they surrounded it with ditches which perpetually contained stagnant water, as if the natural evils of the situation and climate were not sufficient for their inevitable destruction. The great mortality which befell the Portuguese at that place urgently bears striking and melancholy proofs of their error. Not only these instances but many others fully as notorious present themselves, particularly in colonizing of islands and new settling. Nearly all the ancient cities have undergone the same fate, even Rome, formerly the most enlightened in the world, notwithstanding its

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celebrity or situation; for her peculiar location thousands of her inhabitants have fallen victims to that pestilential monster Marsh Miasmata; and at this time that ancient city, once mistress of the world is said to be rapidly depopulating in consequence of her perpetually extending marshes.

Our own country is not destitute of similar examples. The situation of New Orleans and the mortality that annually visits it, which is sadly felt by its inhabitants, are evidences of the truth of this assertion.

The erroneous opinions entertained concerning the cause of sickness in unhealthy countries, did not less contribute to their mortality, than the choice of situation on which to build cities and ports. It was generally supposed that the blood had to undergo a thorough change by the diet of the country and not until then would new settlers be exempt from disease. From this erroneous principle, a most fatal method of

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seasoning themselves to the unhealthy climate was adopted. They depleted by small bleedings until as much blood was taken away, as it was supposed the body contained. The unhappy adventurers were thus reduced to extreme weakness. Supposing that the loss of blood was immediately supplied by the food and water of the country and thereby flattered themselves that they should possess constitutions as well calculated to bear the inconveniences of the climate as the natives themselves.

It has been a very general but erroneous opinion, that the vegetable productions of unhealthy climates needed as diet were a great cause of disease, particularly to strangers. This idea was entertained even by some of their leading men, so much so that if they were stationed in an unhealthy climate they would have all the provisions of their table, brought from their native country. But that the vegetable

productions of such climates cannot be the cause of fevers is very evident, for we know that our daily luxuries, and finest delicacies are the productions of the most unhealthy Countries, and yet are eaten with impunity.

Some are so superstitious that they compute the mortality that often prevails in marshalic Countries to the vengeance or God in sending judgment for some public sin, such an opinion prevailed even amongst a considerable number of the inhabitants of this City, in its memorable Mortality of nearly three.

The prejudice of Contagion is even at the present time sustained by more than three fourths of all the human race, but I am glad to say that in America its terror is gradually giving way to a more rational Precaution. Many more facts might be produced, to shew that the insanity was generally the cause of a greater part of their epidemic diseases, and also to exemplify the great importance of Governors and Commanders as well as physicians, being well acquainted with effects of Marsh miasmata, and the

situations most productive of it for the health and welfare of those under their commands.

The important truth of the existence of Marsh Miasma is now so well ascertained and generally admitted that many proofs of it will scarcely be deemed necessary. To satisfy ourselves of its existence it will only be necessary to turn to the Facts stated by such distinguished and experienced Characters as Lancisi, Pringle, Lind, Clark, and Bancroft, with the excellent and very instructive work of Sir Johnson, who has done honour to himself and great good to the world, in his productions on this very momentous subject. A few prominent facts to prove its existence perhaps may not be deemed unnecessary.

Dr. John Hunter in his observations on the diseases of the army in Jamaica, informs us that the place in Kingston Harbour or that island, at which the ships of war take in their water, being wet and swampy it universally seems, especially

if the men employed in filling the water casks remain on shore all night, that they are taken sick, either at the time or in a few days after. There are examples where out of great numbers sent on shore on that duty not even one escaped a fever. The interesting observations of Dr Blane on the diseases of Seamen afford some striking examples of the evident existence of Marsh Miasma. The works of Dr Lind are also rich with satisfactory evidences; one in particular the unfortunate attempt to make a settlement on one of the East India islands which soon drove us from it in the first six months. It appears that while the winds blew in from the sea, the settlements were perfectly healthy, but during the season that the wind blew over the marshes both of that island and the neighbouring sea, a fever of the most malignant nature was produced, which frequently cut off the strongest man in twelve or fourteen hours.

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cause but the exhalations that arose from the putrefaction of vegetable and perhaps of animal matter that had been suffered to remain in her docks. The board of health diligently searched for an imported cause for the late fever in New York, but concluded it was not substantial; and happily for them, early imputed it to an atmospheric origin. I have been of late creditably informed of an experiment made during the fever in that City, by suspending two pieces of fresh meat, one in the infected district, and another without, the one in the infected part very soon became putrid, while the other remained perfectly sound.

I am almost convinced that no man who read of the fevers of Cadiz, Carthagena, Gibraltar, and Zeland with those of Batavia, Senegal, St. Domingo and Philadelphia, without assigning to himself the existence of the deleterious principle of miasma as their cause.

Supposing without any other proof the existence of,

Miasmata, and that it is a powerful and frequent cause of fever, it may seem now expedient to enquire into its Origin, Nature and Effects.

Its technical name Marsh Miasmata would indicate that it was first supposed to be only peculiar to Marshy places, but too frequent experience teaches us that it may be produced on Mountains, in Pastures, Cities and in Shipping as well as from the surface of swamps, in any place where there is dead matter with sufficient degree of heat and moisture to carry on the process of Putrefaction

It is nevertheless conceived to be a less speculative method by far than Sir George Ferguson's, that the cause of disease does not depend on the noxious effluvia arising from putrefaction of vegetable or animal matter, but from pure aqueous particles, uncombined with other exhalations. This doctrine is ably and justly esteemed in the works of Dr Bancroft.

Sir George Ferguson gives Batavia as a local example in favour of his doctrine; but the writings of

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Drs Johnson, Lind, and Burnett so clearly prove that it is impossible for the imagination to conceive a situation more favourable to production of Marsh miasmata, than that of Batavia. It is stated by them that it is much more healthy during the damp and rainy season, than the dry, but contrary must have been the case, had the doctrine of Sir George Ivedyer been true. The testimony of Dr John Hunter decidedly proves that simple moisture is harmless. It has been frequently remarked by men of experience, that a Ship's crew are rarely sick while at sea, but seldom remain in port a fortnight without some attack of fever or fluxes. But if Dunn aqueous vapours alone were really a cause of fever, we should uniformly see that sailors would be more liable to disease on the Ocean than in harbour.

The remarkable healthiness of the men employed in the New Foundland Fishery, when it is well known they are generally enveloped in the dampest fogs

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for several months without incurring any disease, affords a striking proof that the atmosphere loaded with pure moisture alone is not a cause of fever.

It appears from the preceding remarks that the obnoxious principle of miasmata does not arise from pure aqueous vapours. And it is fully as obvious that it does not arise from mineral substances, as they never become sufficiently heated by the atmosphere to assume an aeriform state.

It is now pretty generally acknowledged that the miasmata which proves so destructive to the human race, are the effluvia arising from the putrefaction of vegetable and perhaps of animal matter.

It is not yet very satisfactorily ascertained, whether it is the putrefaction of vegetable matter alone, or animal, or a mixture of both, that produces the deleterious principle of miasmata. It is highly probable that

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this property is derived from vegetable matter exclusively. The case mentioned by Lancisi of macerating hemp and flax in the vicinity of a town, which occasioned an epidemic which proved very fatal to its inhabitants, and that on the process being prohibited, the disease disappeared; affords a very striking proof of that position. Equally as injurious effects have been ascribed to large heaps of putrifying indigo plant, occasioning dangerous and fatal cases amongst the Negro employed in its culture and the inhabitants around:

With regard to animal matter numerous facts may be produced to prove, that however putrid it may become, its effluvia alone, do not excite fever of any kind. The exhalations from the putrefaction of animal matter in extensive Grave yards have been proved by frequent investigation, not to be productive of any constitutional injury, though frequently they occasion much alarm and greatly annoy the surrounding inhabitants by their very

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offensive smell. The fact, manufacturers of glue, tallow chandlers, and the attendants in large dissecting rooms, living in an atmosphere of animal putrefaction, and yet enjoying the best of health, might be supposed to be sufficient without any other evidence to decide the question.

However, miasmata are most commonly produced by marshy situations, which are observed to be highly stored of animal as well as vegetable substances. It is the opinion of Dr Johnson that air nature is teeming with animal as well vegetable life. That myriads of animated beings whose vitality has scarcely commenced, are at an again closed in death, and no sooner does the animating spark desert them, than they are dissolved by the heat and moisture of the climate, and then during their dissolution in combination with vegetable matter, a new and inexplicable something is formed, which operates with a powerful and baleful influence on the functions of

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the human frame. I cannot venture to assert, taking these circumstances into consideration that animal matter has no share in producing the morbid exhalations in question. But it is of no practical importance, I am willing to agree that it is possible that miasmata may be formed by a combination of both.

As it is from vegetable, or vegetable and animal matter during putrefaction, that miasmata are produced the following circumstances therefore are requisite for the spontaneous decomposition of those matters, Moisture, the contact of air, and a certain degree of Warmth.

With regard to moisture it is so necessary that there is nothing more efficacious in preventing such substances from putrifying, even for centuries than the total deprivation of it. As moisture is essential to putrefaction, no miasmata can be produced in a soil which is perfectly dry; consequently it is from that

long drought, to which some of the West India islands are liable and some of the coasts of Africa, are very seldom affected with Marsh fevers in those dry seasons; but they become prevalent whenever frequent rains set in.

The presence of air is likewise essentially for the process of putrefaction; moisture alone being insufficient to carry it on. Thus substances have been preserved for ages, by being immersed in water, which would have been readily decomposed in open air. These examples are not so applicable to animal matter; they naturally contain more air and moisture, and therefore require less for their decomposition, than vegetable substances: Hence we may perceive that the formation of miasmata, instead of being assisted, will be greatly impeded by a superfluity of water. It will be most abundantly produced in that soil which contains no more moisture, than is really

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These important facts will enable us to understand why in some countries, frequent and heavy rains render Marsh fevers prevalent, while in others the deprivation of rain for two or three Months, produces equally Morbid effects. What has been mentioned respecting the Western Coasts of Africa and the West Indian islands, will serve to illustrate and prove the morbid effects of moisture in a warm climate; and the same effects produced in effluvia from the want of rain, we need only refer to the drying up of ponds, rivers, and branches in drought ty Countries, which being naturally low, are mostly overflown during the rainy season in which the inhabitants are commonly healthy, fevers being rarely seen among them until the dry weather has so far caused the water to evaporate from the ground, as to leave the surface uncovered in many places. There are cases related

by Clark and Lewis with many others which testify to this fact.

We now see the propriety there would be in entirely overflowing marshes during the heat of summer, it having been always found, that so long as marshes are completely overflowed, the vapours arising therefrom are innocuous, and that they may become injurious when so much of the water has been evaporated as to expose the surface of the soil to the air.

Sir John Pringle gives a decisive example of this. A section of country was inundated at the commencement of a war, for military purposes. Peace being made early in the summer the water was let off, and the ground which had been covered by it, was by this operation made bare and exposed to the sun's rays; so that a dangerous fever of the remittent kind soon raged. The people being more sensible of this, some brave settlers let in the water again, and kept it up till winter, an expedient which had the desired effect, as it has done on many

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other similar occasions. Consequently not only Marsh, but any other soil that retains just enough moisture or water to stagnate and carry on putrefaction will produce Miasmata.

Dr Ferguson justly remarks that every one knows that Miasmata are not generated from the bottom of the lake or pool, but from its drying or half dried margins.

This said Febrific miasma is certainly generated from the paucity of water, where it had previously abounded. Provided that paucity be short of actual dryness.

The production of Miasmata that is the last of the agents which are to be noticed. Without this agent it is known that putrefaction is wholly suspended. In a freezing temperature, it does not take place at all; it proceeds slowly even at a temperature of forty degrees Farenheit, but in proportion as the mercury rises above this degree, putrefaction takes place more readily

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and proceeds with greater activity, being most rapid and complete in a temperature of about one hundred degrees; every addition of heat however, beyond this, seems to check that process, perhaps this is a temperature too limited. Hence we perceive how much more copiously the Miasmata given out by vegetable and animal decomposition arise from marshy grounds in Hot than in Cold weather, inasmuch as a warm temperature yields a potential supply of materials from which Miasmata are formed.

It is not surprising then that we should uniformly find, that the exhalations of marshes, should be more powerful in hot than in cold climates, or that the violence of marsh fevers should generally correspond with the heat of the atmosphere at or some time previous to their occurrence.

It has been universally accorded by medical observation, in this city, that when the heat averages about five or eighty degrees, during the months of June and July, it is most productive of

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In northern climates the surface of the earth remaining frozen for a considerable time, marsh fevers seldom occur, and if they do, are of the mildest and most innocuous form. But as we proceed to a warmer climate, they frequently assume a more aggravated form, from the simple tertian to the remittent and a malignant grade of Yellow fever. These facts are so conspicuous, that they do not require examples to prove them.

In conjunction with the last mentioned requisites, Soil, was thought to have considerable influence in the formation of Miasmata. It is said that Peat Bogs do not produce it, though they may contain large quantities of vegetable matter. These Bogs, in a remarkable degree possess the power of preserving substances from putrefaction.

It is thought, and perhaps with some propriety, that Clayey Soils have considerable influence in promoting the formation of Miasmata.

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It is possible that its influence is occasioned by retaining the water necessary for the decomposition of organized matter. The celebrated Linnaeus, who wrote his inaugural dissertation for the degree of doctor of Physic on this subject, supposed that intermittents were produced by the presence of this soil, independent of the effects of temperature. A Swedish clergyman represented the same to be a fact in the city of Philadelphia.

But the circumstance of the epidemic in Batavia would seem to prove that Miasmata may likewise arise from sandy soils. It appears that particular towns and most of those seaports, that are accessible to shipping are peculiarly liable to Miasmatic diseases. Whether this influence is occasioned merely by the greater heat, which at such times commonly exists in these towns than in the surrounding country, and which may exert-

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the powers of such miasmata by producing the decomposition which produces them, or rather, it is probably the result of a difference in the organized matter in issue, by the excessive temperature, as yet not avoided upon.

It is hardly necessary to mention that interior pond country are peculiarly adapted to the production, especially such as are flat and marshy. Alluvial soil, be otherwise charged with being well suited to the formation of Miasmata.

The exciting cause of this febrific miasma, is in a great degree influenced by season, so much so, that we rarely see it existing in a very dangerous state until the middle and latter part of summer; and its specific effects are always diminished in the autumnal months.

Miasmata may be produced in greater or less quantities according to the adaptation of the season and soil; this in Charleston where the season is very warm, the thermometer varying

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from ninety to ninety six degrees, with considerable rain, the yellow fever generally prevails. But different effects result from an extensive hot season, from ninety to a hundred degrees, without rain.

Dr Chalmers in his observations, relates a season of this nature, that occurred in Charleston, and yet a more healthy season had never been known, so long as the weather continued steadily warm and dry. Water could not be found by digging to a considerable depth below the surface of the earth. Being so completely dry it is obvious that no miasmata could be formed.

Charleston is built upon low grounds, and containing a large proportion of sand, more frequent falls of rain are therefore necessary for the production of marsh effluvia, than would otherwise contribute to that effect.

Dr John Hunter in his observations, gives examples of certain dry sandy spots along the coast, in tropical climates, in which

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It has been thought a singular circumstance that in some countries, as for instance the Cyprus, rains should produce sickness, while in other places, especially in more northern climates, a want of rain for two or three months in the summer should produce nearly the same effect. Perhaps it may be accounted for in this way, that in warm climates decomposition and evaporation go on more rapidly, and if the soil remaining dry for a short time, it becomes so completely exhausted of moisture, as to obstruct these processes, and without them, it is evident that miasmata cannot be produced. In colder climates, these processes go on much slower, and thus the water remains longer in the ground; stagnation or decomposition does not take place till it is forced by the continual influence of what heat there is, with the contact of air without ever

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What has been stated seemingly shows, that for the formation of Miasmata season, with other requisites, must be suited to the local circumstances. Thus for the two last years, the low parts of the Southern States have been quite healthy, while the middle and upper parts have experienced a fatal epidemic. Another circumstance not less decisive, is the late fever in New York. It is plainly seen that the season and locality of that place have been adapted to the formation of Miasmata; while the city of Philadelphia, situated nearly in the same degree of latitude, has enjoyed perhaps better health than common. When the thickly settled parts of this city were infected with the most malignant Yellow fever, its suburbs were quite healthy, and conversely this season has been favourable to generation of an epidemic in its suburbs and surrounding country, which has prevailed with an

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The nature, and more particularly the chemical qualities of this spirit are not yet but imperfectly ascertained, notwithstanding the many ingenious trials that have been made for its investigation. No doubt it may consist of the gases incident to putrescence in a peculiar chemical combination, which causes it to be the deleterious principle. Miasmata, strictly speaking, is an aerial fluid, combined with atmospheric air, and not dangerous, except the air be loaded with it: for dispersion, as is evident, renders it harmless; and on the contrary concentration or rather accumulation; for when it is detained amid wood and jungles and especially during the damp season, where there are no regular currents, by which it may be dissipated, it becomes proportionately powerful. It is more or less dense according to the density of the air which holds

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There is no doubt that the formation and exhalation of miasmata is greater during the heat of the day than at night, and during the heat of the day, the air is more rarified and the poisonous exhalations at such a time must consequently be more widely diffused. At the close of the day, the heat decreasing, and the vapours which had been exhaled and diffused through the atmosphere, by the heat of the sun, become condensed and descend with the dews that fall early in the evening, and combining with those that continue to be disengaged from their source, must form a dense concentration, highly capable of affecting the constitution. Consequently, we find that the greater number of those who suffer are attacked or receive it according to principle, at the period above mentioned. The morning, likewise, which is usually marked by a sensible revivification of air, is also attended with a fresh precipitation

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There are facts which seem to indicate that miasmata have a greater specific gravity than the air which holds it in suspension. It is among the first of the vapours that condense and descend in the evening, is more concentrated as it descends and forms a dense stratum, highly impregnating the atmosphere, near the surface of the earth. These facts mentioned by Dr John Hunter are confirmed by subsequent observation, in proof of this position. Soldiers stationed in barracks placed on miasmatic situations, and having two or more stories, are comparatively secure, according as the nights they are quartered in the same building.

It is ascertained that the epidemic that prevailed in the neighbourhood of this City last fall, which was the fall of 1821, and which no doubt was from a miasmatic influence; was more or less malignant according to the height of the situation. The people who habited the top of a mount, not far from this

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city called Chesnut Hill were not affected with the epidemic, and those who lived on the sides of the hill were less affected, than those who lived in the bottoms and low lands.

The distance to which the exhalations of marshy grounds may be conveyed from their source, and retain the power of causing the yellow or other marsh fevers, will partly depend on the force of the wind, the extent of the surface from which they arise, and their being more or less copiously extricated from that surface. If the wind be moderate, and blows steadily from the same point, and if the miasmata be abundantly emitted from a great extent of surface, it seems probable, that so large a mass, as would they be dense, might be conveyed a quarter of a mile, before it seems so diluted with atmospheric air, or so dissipated by the wind, as to lose its morbific powers. Perhaps under the most favourable circumstances, it might be wafted to some greater distance,

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but it is highly probable that in a majority of cases it is not carried even half that distance.

From the peculiar density of Miasmata, the interposition of trees, high walls, blocks of buildings, and even cloth may operate in so arresting the deleterious particles, as to prevent their, in a concentrated state, on the opposite side, from direct access of the infected air, which passes over the marshes, and they never suffer any inconvenience from them, so long as they remain behind such an interposition. Lancisi cites a great number of examples, which prove the utility of woods situated between the habitations and marshes; and several that demonstrate the dangers resulting from their destruction. Dr Johnson relates numerous cases of a similar nature, one of a village that was famed for its salubrity, but after the lofty trees, by which it was surrounded, had been cut down, it lost all its reputation; the

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likewise relates a case of one who died in a square, where the inhabitants had been much affected from inhaling infected air, which had been saturated with Miasmata from the Marshes on the Coast, and carried there by a current of wind blowing in that direction, while those in the opposite side almost escaped.

It is the opinion of Drs Johnson and Lind that fire and smoke, have a considerable influence in mitigating the effects of Miasmata. The former gives an example of a man, who lived near the Pontine Marshes in Italy, that had been employed for several years at a furnace and enjoyed perfect health, and bore a healthy appearance, while those around him were continually exposed to a mortal disease, and eventually dragged on a truly miserable existence. On being interrogated, he said the only precaution he made use of, was to return to his hut at sunset, where he kept a continual fire.

[illegible] It is [illegible] the Dr. that if Miasmata did penetrate his hut, [illegible] rarefied by the heat of the fire incessantly [illegible], and the exhalations were vitiated by the heat and repelled by the smoke of the furnace about which he was engaged. The [illegible] his advice to Europeans, recommends those persons that are subject to intermittents, not to reside in low marshy places during the rainy season, but that they should then retire into large towns, where the ill effects of damp and bad air, are in some measure corrected by the number of fires and smoke.

But however efficacious may be in this place or prevention its approach, experience teaches, that it fails in correcting its ravages.

It appears from observation that miasma has no peculiar smell, that will indicate its deleterious or virulent principle; nevertheless it is frequently accompanied with disagreeable

but which does not seem to aggravate its effects in the least. It is not unfrequent, that while we inhale, as we think, air embalmed with the perfume of plants, the traveller of fine evenings or mornings which seems so innocuous, is in reality a victim. We must infer that there is nothing to warn us of our danger.

It is likewise the opinion of Dr. Francis, that the two principles may be combined, and a separation of them take place. He relates a case of his assistant and himself; who were situated near a marsh that emitted a disagreeable smell. They used the greatest attention to keep the doors and windows closely shut, though they could not exclude the very offensive odour, yet remained quite hearty, while those around them were sickly.

It is not only ascertained that moisture influences the formation of miasmata, but likewise favours the suspension of it in the atmosphere.

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Drs. Blane and Johnson consider air as a vehicle of noxious exhalations; one says it seems to have a greater chemical affinity for damp than dry air.

The other gives examples of dews, which have always considered as extremely pernicious in countries where bad air is generated. The following remarks of Dr. Lind are favourable to the supposition that aqueous vapours favour the descent of miasmata with the dews. The first rains that fall in Guinea, are commonly supposed to be the most unhealthy. They have been known to render the leather of shoes and clothes rotten in a few hours. It must appear obvious to every person, that the exhalations arising from such poisonous sources, must prove highly deleterious to the human constitution.

In what manner or through what channel it is conveyed to the sensorium, so as to produce its effects on the constitution, we are quite ignorant. Whether it is taken into the stomach or into

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the circulation by the lungs or by the absorbants of the skin, or whether it makes its first impression on the Schneiderian membrane, as Dr. Rousseau has attempted to prove, I shall not venture to decide. As there is much uncertainty and difficulty, attending every explanation, and as each of those modes have been decided to be, men of experience, it does not become me as a medical student, on this occasion to determine but the parts most centrally affected by miasmatic miasmata are the stomach, the brain and nervous system.

Whether it is by a direct sedative or stimulating operation that its effects are produced on the constitution, I shall likewise leave to better experience.

The space of time which intervenes, between the application of this poison to the system and its evident operation on the form of fever, depends on the degree of its concentration,

ing the Predisposition of the Patient; It may take place on immediate contact or, as some say at the distance of nine Months. But perhaps twelve or fourteen days is a more common period in which before this febrific miasma is manifested in the shape of actual disease.

Perhaps the annual return of fevers may be accounted for, by the protracted retention of marsh miasmata which had been received into the body during the preceding summer or autumn, and rendered active by some exciting or predisposing cause of fever in the body.

In general, diseases will be most violent in those cases where it appears soonest after the morbid cause has been applied to the body; and the rapidity of its production will be in proportion to the quantity and concentration or force of the noxious miasma.

The predisposing causes, or such as render persons most susceptible to the poisoning effects

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of Miasmata, are intemperance, [illegible] fatigue, and any relaxing debilitating excess; It is likewise contended by some, that the Sun and Moon at particular seasons may have some influence. There is another important cause not to be overlooked, which is been, unaccustomed to miasmatic air, though in some instances, the oldest inhabitants do not escape.

There is no doubt but the mind presents some of the strongest predisposing causes; as fear, more especially cowardly; disappointment, and chagrin, are the depressing passions, which universally induce the most decided and unequivocal predisposition to disease.

The truth of these observations is amply and satisfactorily established in the valuable work of Dr Johnson. —

I have now brought to a conclusion the observations that appear to me to illustrate the important

subject of

subject of miasmatic poison. I am aware how inadequate my powers are to master the extensive details that are connected with and are essential to its elucidation. I pretend to no originality of argument or fact, but gratefully acknowledge that whatever merit may be ascribed to this feeble attempt is due to my illustrious preceptors in this Medical School, whose instructions have at the same time enlightened and directed my researches. With them I leave my essay to its fate, with a confidence that its deficiencies will not be too harshly dealt with, and that it will be regarded as the production of an inexperienced youth, complying with the regulations of the University.

Hudson A. Thornton.

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It is not uncommon for soldiers to feign contractions of the limbs. as the consequence of wounds, rheumatism, &c. In these cases by the forcible application of a bandage over the flexor muscles, we may succeed in relaxing the limbs, and proving the existence of fraud in the case. If the leg be in a state of apparently unavoidable flexure, by obliging the patient to poise himself upon the other one, an involuntary extension of the curved limb will frequently take place, discovering at once a proof of the real nature of the affection. In this manner it is said, twelve persons were detected who had resorted to this artifice to evade the conscription law. A person who feigned contraction and immobility of one of his members, and was known to have been piously educated in the rites of the Romish Church, was detected by commanding him to swear upon the crucifix to the

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